

REMARKS

Claims 1-4 have been amended in this response. Thus, claims 1-9 are currently pending the present application. Favorable reconsideration and allowance of the present application are respectfully requested in view of the following remarks.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 2, 5-7 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hughes et al. (U.S. Patent Publication No. 2004/0154787, hereinafter “Hughes”) in view of McLain (U.S. Patent No. 3,902,552, hereinafter “McLain”) and Huet (U.S. Patent No. 3,154,141, hereinafter “Huet”).

Claims 1-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shibata (JP 2003-97898, hereinafter “Shibata”) in view of Tatsumi (JP 9-72683, hereinafter “Tatsumi”) and further in view of McLain and Huet.

These rejections are respectfully traversed.

Independent claim 1 as amended recites, *inter alia*, “wherein an inlet part of the water passage in communication with an outermost part of the refrigerant passage having water of a predetermined temperature or less at which a scale component is hardly deposited is provided with a heat transfer enhancer and the rest of the water passage is devoid of a heat transfer enhancer.” Independent claims 2-4 recite similar subject matter.

The claimed invention is directed to an inlet part of the water passage in which the water has a lower temperature such that a scale component is hardly deposited to the inlet part. When the water temperature of the water passage is low, the heat transfer coefficient of the heat exchanger becomes lower. Therefore, the claimed invention provides a heat transfer enhancer to the inlet part of the water passage to enhance heat transfer at the inlet part and improve the performance of the heat exchanger. None of the applied references teaches or suggests the features of amended independent claims 1-4.

Hughes, McLain and Huet

Hughes describes a water tubes (14) having a conventional heat transfer enhancement in the form of multiple small grooves (52) formed on the interior of the tube wall. See Figure 4 of Hughes. However, Hughes does not disclose or suggest an inlet part of a water passage in communication with an outermost part of the refrigerant passage having water of a predetermined temperature or less at which a scale component is hardly deposited is provided with a heat transfer enhancer and the rest of the water passage is devoid of a heat transfer enhancer as claimed.

McLain describes a method for manufacturing metal tubes by forming patterns in or upon the tubing wall. Specifically, McLain merely describes forming an interior patterned surface (17) between smooth surfaces (18, 19). See Figure 2 of McLain. The intervening smooth segments allow tube cutting for creating tubes of desired length. However, similarly to Hughes, McLain is not concerned with deposition of scale component at the water passage as claimed. Therefore, McLain does not disclose or suggest an inlet part of a water passage in communication with an outermost part of the refrigerant passage having water of a predetermined temperature or less at which a scale component is hardly deposited is provided with a heat transfer enhancer and the rest of the water passage is devoid of a heat transfer enhancer as claimed. Thus, McLain does not make up for at least the above-noted deficiency of Hughes.

Huet describes roughened heat exchange tubes having asymmetric and irregular grooves of small depth or striation on the surface of the tubes. See Figures 1-4. However, similarly to Hughes and McLain, Huet is not concerned with deposition of scale component at the water passage as claimed. Therefore, Huet does not disclose or suggest an inlet part of a water passage in communication with an outermost part of the refrigerant passage having water of a predetermined temperature or less at which a scale component is hardly deposited is provided with a heat transfer enhancer and the rest of the water passage is devoid of a heat transfer enhancer as claimed. Thus, Huet does not make up for at least the above-noted deficiency of Hughes and McLain.

Shibata, Tatsumi, McLain and Huet

Shibata describes a heat exchanger having a water tube 1 and a refrigerant tube 2. See Figure 1 of Shibata. Tatsumi describes a heat transfer tube 7 having grooves in the entire inner periphery surface of the tube. See Figure 1 and Abstract of Tatsumi. However, neither Shibata nor Tatsumi discloses or suggests an inlet part of a water passage in communication with an outermost part of the refrigerant passage having water of a predetermined temperature or less at which a scale component is hardly deposited is provided with a heat transfer enhancer and the rest of the water passage is devoid of a heat transfer enhancer as claimed.

As discussed above, McLain is not concerned with deposition of scale component at the water passage as claimed. Therefore, similarly to Shibata and Tatsumi, McLain does not disclose or suggest an inlet part of a water passage in communication with an outermost part of the refrigerant passage having water of a predetermined temperature or less at which a scale component is hardly deposited is provided with a heat transfer enhancer and the rest of the water passage is devoid of a heat transfer enhancer as claimed. Thus, McLain does not make up for at least the above-noted deficiency of Shibata and Tatsumi.

Also, similarly to Shibata, Tatsumi and McLain, Huet does not disclose or suggest an inlet part of a water passage in communication with an outermost part of the refrigerant passage having water of a predetermined temperature or less at which a scale component is hardly deposited is provided with a heat transfer enhancer and the rest of the water passage is devoid of a heat transfer enhancer as claimed. Thus, Huet does not make up for at least the above-noted deficiency of Shibata, Tatsumi and McLain.

In view of the above remarks with respect to independent claims 1-4, Applicants respectfully submit that the applied prior art does not make the claimed invention unpatentable. The dependent claims are at least allowable by virtue of their dependence on corresponding allowable independent claims 1-4. Consequently, the rejection fails to establish *prima facie* obviousness of any of the rejected claims. Thus, Applicants respectfully request reconsideration withdrawal of the Examiner's rejection under 35 U.S.C. § 103.

CONCLUSION

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Dennis P. Chen Reg. No. 61,767 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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